Module 6: Paratransit Computer-Aided Dispatch (CAD)

> ### M o d u l e   6
>
> ### P a r a t r a n s i t   C A D
>
> *Transit Management 6-1*

TRANSIT MANAGEMENT TRAINING ROADMAP
Module 1: Introduction to ITS and APTS
Module 2: Automatic Vehicle Location Systems
Module 3: Automated Transit Information
Module 4: Transit Telecommunications
Module 5: Transit Operations Software
Module 6: Paratransit Computer-Aided Dispatch
Module 7: Electronic Fare Payment
Module 8: Technologies for Small Urban and Rural Transit   Systems
Module 9: Stages of ITS Deployment
Module 10: What Can ITS Do for Me?

Where is Paratransit CAD?:
- Scheduling
- Dispatching

Technologies:
- Scheduling and dispatching software
- Transit telecommunications
- Mapping software
- AVL linkage
- On-board mobile data terminals
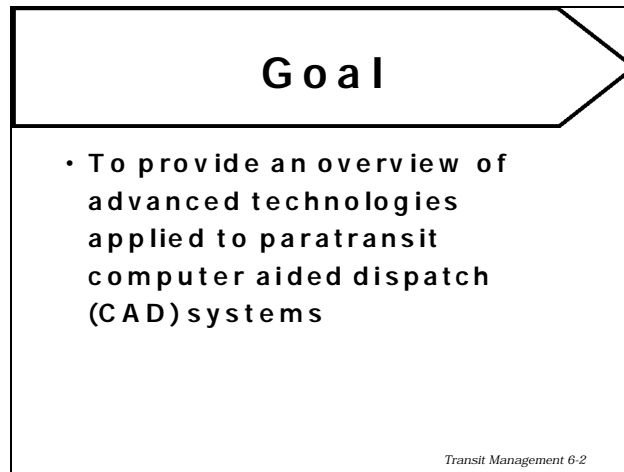
Module 6: Paratransit CAD
1 Hour

Introduction

Schedule The following table shows the times and activities for this module.

Time	Activity/Topic
5 min.	*Lecture/Discussion:* Introduction
5 min.	*Lecture/Discussion:* What Is Paratransit?
15 min.	*Lecture/Discussion:* Paratransit Technology Integration
15 min.	*Lecture/Discussion:* Advantages and Disadvantages
5 min.	*Lecture/Discussion:* Examples
15 min.	Exercise 6-1: Custom Course Notes
60 min.	Total Time

Introduction, Continued

Slide: Goal

> # Goal
>
> · To provide an overview of advanced technologies applied to paratransit computer aided dispatch (CAD) systems
>
> *Transit Management 6-2*

Goal   **Read** the goal of this module.

Objective   **Read** the module objective:
- Given an APTS Technology Reference table, students will list three benefits of using Transit Operations Software in their agency.

Orient with the roadmap   **Show** the class where they are with the roadmap on page 1 of their SG.
Explain:
- we've just reviewed Transit Operations Software (TOS)
- this module, Paratransit, relies heavily on the techniques we've just finished discussing
- also, like TOS, it is a part of the APTS component of the ITS infrastructure called transit fleet management
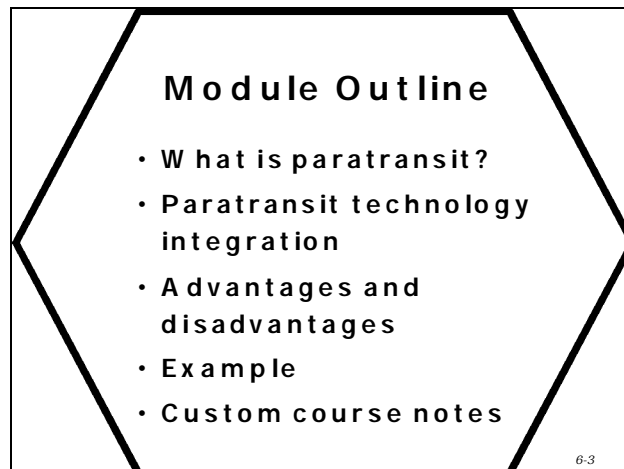
Introduction, Continued

**Oppor-
tunities**

Say: According to the state-of-the-art APTS *Update '98*, "advances in paratransit operations software have contributed toward making transportation fully accessible to the disabled."

The new software has helped to increase performance and efficiency of paratransit operations. Because of this recent technology surge, there is a great integration opportunity for agencies now.

**Slide:
Module
Outline**

Module Outline

- What is paratransit?
- Paratransit technology integration
- Advantages and disadvantages
- Example
- Custom course notes

6-3

What Is Paratransit?

Length   5 minutes lecture/discussion

Slide:
What Is
Paratransit?

W h at Is P ar at r an si t ?

· Definition
· Scheduling
· Dispatching

Transit Management 6-4

What Is Paratransit?, Continued

Definition   **Say**: Paratransit is a public transportation service that is more flexible and personalized than conventional fixed route, fixed schedule service. It can be available to the general public and/or to certain groups, such as the elderly. The ADA requires that public entities operating fixed route transportation for the general public also provide complementary paratransit service to persons unable to use the fixed route system.

Say: The ADA specify:
- when this service is required
- eligibility criteria for these paratransit services
- the level of service which must be provided
- standards for certain aspects of operation

According to the Code of Federal Regulations (CFR) Title 49, Part 37, the regulatory component of the ADA: "Each public entity operating a fixed route system shall provide paratransit or other special services to individuals with disabilities that is comparable to the level of service provided to individuals without disabilities who use the fixed route system" (49CFR37.121(a)).

Explain table of definitions on page 5 of the SG to give the students a working vocabulary.

Note to Instructor: Complimentary paratransit service is mandated by ADA.

What Is Paratransit?, Continued

Definitions   **Discuss** the following terms with the class.

- **Ask** if students use these terms the same way in their agencies. *Note: some students may normally use other definitions of these terms.*
  - ◊ Agree on the terms for the purposes of this module.

Term	Definition
Paratransit	Paratransit is a public transportation service that is more flexible and personalized than conventional fixed route, fixed schedule service. It can be available to the general public and/or to certain groups, such as the elderly.
Americans with Disabilities Act of 1990 (ADA)	A civil rights law passed by Congress in 1990 that makes it illegal to discriminate against people with disabilities in employment, services provided by state and local governments, public and private transportation, public accommodations, and telecommunications.
Demand Response	Service characterized by flexible routing and scheduling of relatively small vehicles to provide door-to-door, curb-to-curb, or point-to-point transportation.
Fixed Route	Service provided on a repetitive, fixed-schedule basis along a specific route with vehicles stopping to pick up and deliver passengers to specific locations; each fixed-route trip serves the same origins and destinations, unlike demand responsive and taxicabs.

What Is Paratransit?, Continued

Scheduling   **Say**: Paratransit systems can use advanced scheduling
technologies to set up:
- advanced trip reservations
- standing orders/subscriptions
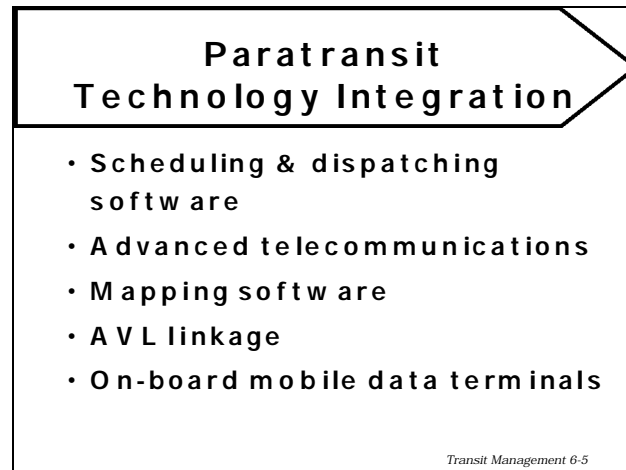- immediate requests when integrated with real-time
dispatching

Dispatching   **Say**: Computer-aided dispatching software can be used to
assign customers to demand responsive vehicles that are
operating in shared ride mode.

Paratransit Technology Integration

Length	15 minutes lecture/discussion

Slide: Paratransit Technology Integration

> **Paratransit Technology Integration**
>
> • Scheduling & dispatching software
> • Advanced telecommunications
> • Mapping software
> • AVL linkage
> • On-board mobile data terminals
>
> *Transit Management 6-5*

Class questions

Ask questions to see how familiar the class is with the technologies listed on the slide, e.g.:

- Has anyone ever used scheduling software?
    ◊ What kind of tasks could you perform?
    ◊ How did it work?

Ask several more questions for each of the more popular technologies on the slide and then **explain** each one.

Scheduling and dispatching software

Say: Scheduling and dispatching software aids in the development of routes, assigning passengers, and creating schedules. These software systems will help paratransit operators become more efficient by grouping and locating rides. The software can also be easily combined with the other ITS technologies listed here.

Paratransit Technology Integration, Continued

Transit telecommu-nications

Say: Communications between dispatch and mobile data terminals (MDT) on vehicles use:

- radio frequency (RF) telecommunications
    ◊ transmissions using radio signals

- cellular digital packet data (CDPD) technology
    ◊ communication which detects idle air time over existing cellular phone channels and sends data "packets" during this time
    ◊ charged per "packet," not for idle time

Geographic Information Systems (GIS)

Say: Geographic Information Systems (GIS) are a combination of electronic maps and relational databases. Users can cross-reference transit information from a database with various maps (fixed bus route, street maps, etc.). GIS mapping software helps determine an individual's location and destination and whether both are within the paratransit zone. Paratransit zones for ADA eligible passengers are (at minimum):
- corridors with a width of 3/4 mile on each side of a fixed route
- plus 3/4 mile radius at the ends of each fixed route
- and any small areas surrounded by these corridors

Say: We'll talk more about paratransit applications of GIS in this module.

Paratransit Technology Integration, Continued

AVL linkage **Say**: AVL systems can be used in paratransit for many different applications:
- real-time ride scheduling
- assisting operator with directions
- providing customers with vehicle status
- aiding in emergencies
- generating travel time statistics

On-board terminals **Say**: Mobile data terminals (MDT) on board vehicles communicate with dispatch to transmit locations and receive instructions such as:
- directions to pick-ups and drop-offs
- cancellations or additions
- trip status
- number of passengers and fares paid
- can be configured to use electronic fare payment systems

Example: Community Transit **Explain** that Community Transit of Delaware County, PA:

- is a private non-profit demand-responsive service
- provides over 1,500 trips per day in the Philadelphia suburban area
- services customers with a transportation disadvantage, including the elderly, persons with disabilities, low-income, medically needy, and children
- is in the process of deploying four integrated APTS technologies:
  ◊ automated scheduling and dispatching software
  ◊ automated identification cards
  ◊ mobile data terminals (MDTs)
  ◊ radio frequency (RF) communications.

Paratransit Technology Integration, Continued

Example: MDTs:
**Community**   • provide the information link between the driver and
Transit   passenger as opposed to between Community Transit and
                     the passenger

                  • put the detailed data regarding the passenger's special
                     needs into the hands of the Community Transit driver who
                     needs it most.

                  • support the rapid and efficient transmission of the critical
                     information on each passenger trip through data
                     communication
                     ◊ could not be accomplished with the same quality and
                        efficiency if it was done by voice
                     ◊ ensures the confidentiality of the information being
                        transmitted between the dispatcher and driver
                     ◊ avoids compromising confidentiality which results from
                        using voice communication to transmit important
                        information regarding a passenger

                  • provide Community Transit dispatchers with direct access
                     to drivers, especially in the event of a schedule or route
                     change
                     ◊ Immediate communication is essential for utilizing the
                        "dynamic" dispatch aspect of the automated scheduling
                        and dispatching software.
                     ◊ Drivers are able to immediately communicate with
                        dispatchers regarding events such as no-shows,
                        vehicle problems, etc.

Paratransit Technology Integration, Continued

**Slide:
Technology
Integration**

Technology Integration

• How much automation?

Transit Management 6-6
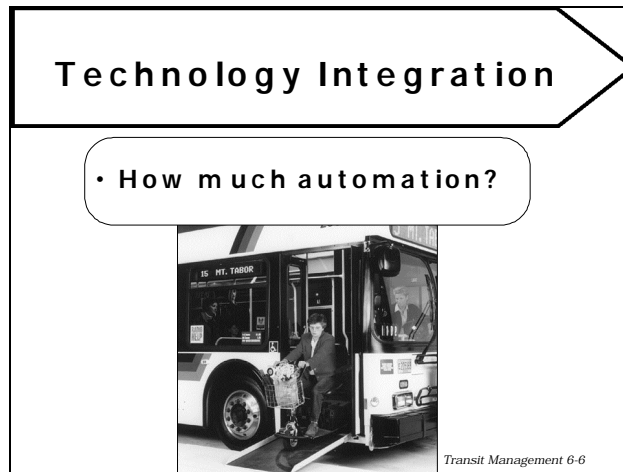
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Paratransit Technology Integration, Continued

How much auto- mation?

Say: Paratransit operators can use ITS technologies in many combinations for scheduling and dispatch. They can use technologies and manual systems, or have full automation.

Automation Levels	Systems
None	Phone operator reservation system with paper records Manual dispatch
Lowest	Computer-aided scheduling Manual dispatch with manual changes to the schedule
	Computer-aided scheduling Dynamic software changes to schedules and routes in real-time Manual dispatch
	Software that automatically communicates changes in schedules and routes in real-time to drivers via on-board displays
Highest	AVL systems to assist in the decision-making process of the software

Paratransit Technology Integration, Continued

Slide: State-of-the-Art Scheduling

State-of-the-Art Scheduling

· Technology allows dynamic rescheduling

Transit Management 6-7
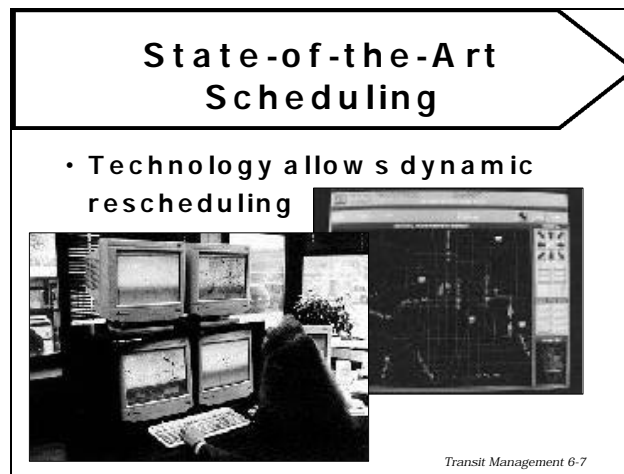
Scheduling software

Say: Computerized scheduling software can automate and improve many paratransit scheduling tasks to:
- develop vehicle routes
- schedule vehicles and assign drivers
- generate driver rosters
- generate timetables
- match clients to available vehicles
- maximize vehicle usage
- view all trips for a client
- create multiple scheduling scenarios and solutions
- modify trip lengths based on traffic, weather, and location
- cross-check trips against holidays
- schedule trips within one hour of the requested pick-up time
  ◊ required under 49CFR37 for ADA eligible passengers
- improve productivity (passengers per hour)

Paratransit Technology Integration, Continued

Class question	**Ask:**

Ask:
- Are any of you aware of agencies that use scheduling software?
- How many of you are aware of agencies that currently have manual scheduling?

Ask for one or two personal stories.

Paratransit Technology Integration, Continued

Slide: State-of-the-Art: Real-Time Dispatching

State-of-the-Art Real-Time Dispatching

- Dynamic re-routing based on changes in schedules
  - radio frequency communications
  - on-board mobile data terminals
  - AVL

Transit Management 6-8

Dynamic re-routing

Say: Using radio frequency communications, on-board mobile data terminals, and AVL technology, paratransit operators can dynamically re-route their vehicles according to real-time schedules. Real-time re-routing allows the dispatcher to:
- check en-route vehicle status
- re-assign trips and redistribute rides from one vehicle to another if there are service interruptions or changes
- gather information in case of incidents
- adjust schedules in the event of last minute cancellations
- remain in the timeframe and service delivery requirements of the ADA

Paratransit Technology Integration, Continued

How it works　　When dispatch needs to re-route a bus, a message is sent using radio communications to the on-board MDT. The driver receives the change on-board on the MDT and makes the change in routing.

Class question　　**Ask** the students:
- Are any of you aware of agencies that use technology for real-time dispatching?

Ask for one or two personal stories.

Paratransit Technology Integration, Continued

Slide: State-of-the-Art GIS

State-of-the-Art GIS

- Combination of an electronic map and a relational database
- Operations planning
- AVL operations

Transit Management 6-9

Electronic map and relational database

Say: As mentioned earlier, users of GIS can cross-reference transit information from a database with various maps (fixed bus route, street maps, etc.). Paratransit applications can take advantage of the features of GIS that we've talked about already.

Continued on next page

Paratransit Technology Integration, Continued

GIS and Paratransit

Paratransit operators use GIS to plan their operations and solve complex problems. Operators can:
- calibrate distances
- determine the geographic eligibility of the client within service area or based on needs, e.g.:
  ◊ If a client cannot reach a fixed route stop, the traveler would be picked up by paratransit.
  ◊ If it is a "high peak" time and the client cannot maneuver in crowded situations, the client would be picked up by paratransit.
  ◊ If the client is in close proximity to the fixed route, the client should use the regular fixed route service.
- find landmarks and directions to assist drivers
- decide if geographic features and road types (bridges, mountains, one-way streets, etc.) will impact scheduling

AVL operations

With AVL and GIS, paratransit operators can do such things as:
- re-route vehicles based on traffic conditions
- find exact vehicle locations on a map and determine the distance to pick-ups and drop-offs
- determine nearest vehicle to request and dispatch in real time
- contact or respond to passengers regarding real-time status of paratransit vehicle

Paratransit Technology Integration, Continued

Example: ACCESS

State of the art technologies can facilitate fixed-route/paratransit coordination. GIS technology can be used to develop information about the accessibility of services and the accessibility of paths-of-travel. ACCESS, a brokerage in Pittsburgh, PA, provides paratransit feeder service and uses a GIS tool to improve customer information systems services and facilitate trip eligibility by:

- gathering and storing path of travel as well as fixed route service information:
  ◊ curb cuts
  ◊ intersection accessibility
  ◊ description of every single intersection
  ◊ sidewalk condition
  ◊ terrain
  ◊ fixed route stop location
  ◊ stop amenities (shelters, benches, phones)
- determining exact walking distances and alternative paths of travel
- determining trip eligibility
- providing customers with "trip tips" which include detailed information about using fixed route service

Such detail in a GIS database tool naturally has a number of maintenance issues.

Web site: http://Trfn.clpgh.org/trcil/access-to-pgh-guide/ transportation.html

Note to Instructor: A brokerage service is a comprehensive approach for managing the mobility needs of passengers through central coordination of local transportation programs.

Advantages and Disadvantages

Length	15 minutes lecture/discussion

Advantages discussion	**Ask** the following questions and write the answers on the board:

- How do you think paratransit CAD systems could benefit the passenger?
- How can they benefit the agency?
- What will it do to your operating costs if you have to switch from manual systems to automated ones?
- What will it do to your staffing and training needs?
- What integration issues may come up?
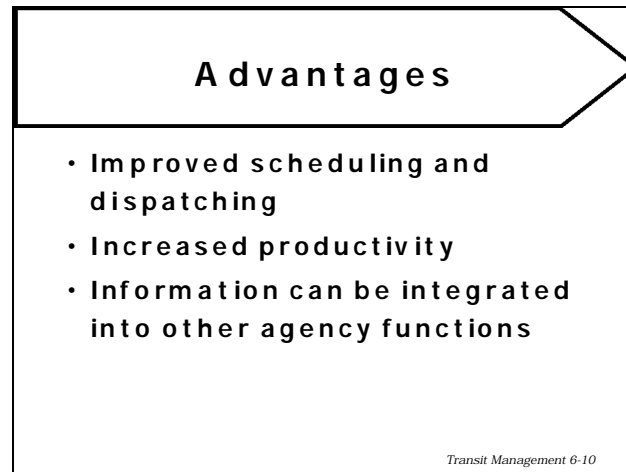- Are there any risks or cost considerations you can think of?

Review the answers.
- **Say**: Let's compare your answers with our slides.

Advantages and Disadvantages, Continued

**Slide:
Advantages**

> **A d v a n t a g e s**
>
> · **Im proved scheduling and
>   dispatching**
> · **Increased productivity**
> · **Inform ation can be integrated
>   into other agency functions**
>
> *Transit Management 6-10*

Review   **Review** any items on the slide not already covered.

**Scheduling
and
dispatching
improved**   All of the paratransit CAD systems help to improve
scheduling and dispatching for demand-responsive fleets.
Paratransit operators can use real-time scheduling and
dispatching to save money and improve service.

**Increased
productivity**   The use of computer-aided scheduling and dispatching will
increase the productivity of paratransit systems by:
- improving schedule adherence
- monitoring the fleet for maximum deployment and efficient
  pick-ups and drop-offs
- dynamically scheduling around cancellations or no-shows
- maximizing vehicle capacity through improved scheduling
- streamlining routes with the help of GIS and AVL
  ◊   can target trip distance or trip time or maximize both

Continued on next page

Advantages and Disadvantages, Continued

Widespread use of systems	There are many vendors selling automated scheduling and dispatching software, and many paratransit systems are using the new technologies.

Say: For more information, there is a table of Paratransit Contacts and their suppliers in the back of the older Update '96 starting on page A-26.

Integration with other agency functions	Paratransit scheduling and dispatching software can be integrated into other agency functions such as:

- fixed route transit systems
  - ◊ determining if some paratransit customers can be moved to fixed routes
  - ◊ knowledge of which areas demand more paratransit service and increasing accessibility of fixed route services and facilities for these areas
  - ◊ travel training programs, e.g., Red Cross sponsored program
- operational reports and statistics
- ADA compliance assurance
- customer satisfaction tracking
- other health & human services agencies

Say: However, with integration comes challenges – we'll talk about some in a minute.

Advantages and Disadvantages, Continued

Manage-ment information	Management personnel can use reports from the scheduling and dispatching software to: • monitor schedule adherence • generate rosters and driver records • create vehicle manifests

Billing and accounting functions	On-board mobile data terminals and scheduling software assist in billing and accounting functions by capturing fare information for billing purposes, such as the number of Medicaid eligible riders, or deductions in personal traveler accounts.

ADA compliance	With scheduling software, on-board mobile data terminals, and GIS, paratransit operators can ensure their system's ADA compliance and check passenger and trip eligibility. With scheduling software, paratransit operators can track: • if an ADA eligible individual has a pattern of missing scheduled trips • if ADA eligible visitors use the paratransit system more than twenty-one days in a year When people apply for ADA Paratransit Eligibility, they can be issued identification cards that interact with the on-board mobile data terminals to: • verify the passenger's paratransit access privileges • verify any personal care attendant's paratransit access privileges • record trip length and duration for billing purposes to the passenger's sponsoring agency

Advantages and Disadvantages, Continued

Other benefits

Benefits to passenger:
- speed
- availability
- information about status

Benefits to agency:
- maximize the fleet usage
- possibly more time for maintenance

Advantages and Disadvantages, Continued

**Slide: Dis-
advantages**

D i s a d v a n t a g e s

· Up-front softw are costs
· Im p le me n ta tio n m a y n o t b e e a s y
   · Integ ra tio n
· N e e d to e va lu a te
   · hardw are and softw are before
   insta lla tio n
   · experie nce of paratransit operators
   w ho are using these systems

Transit Management 6-11

Review   **Review** any items on the slide not already covered.

**Implemen-
tation may
not be easy**

Although there are many paratransit CAD technologies
available, not all of them have been successfully
implemented.

Integration, while possible, is a serious issue.
• If your agency is sharing information with other agencies,
  you may face institutional barriers:
  ◊ Do your organizations agree on terms? For example,
    what counts as a ride? If I take a paratransit feeder to
    take the main transit route, does that count as one ride
    or two? This can make a difference in your statistical
    evaluation of your system.
  ◊ How does a brokered service fit in to your data
    collection?

Advantages and Disadvantages, Continued

Evaluate hardware and software	Paratransit operators need to evaluate all the available hardware and software before implementing any of it.
	
	Again, integration with the outside is a consideration here.
	• If agencies are going to share information, they have to have a common language – an agreement of data terms.
	  ◊ This is commonly known as a data dictionary in software terminology.
	  ◊ Local agencies must agree on the type of data to share and what each piece of data means (e.g., what is a trip?)

Evaluate others' experience	To assist in choosing paratransit CAD technologies, paratransit operators should evaluate the experiences of other operators who have similar systems and needs and use that particular technology. • By using others' experiences, you can narrow down the list of system comparisons and not "reinvent" what others have already done. **Remind** students about the list in *Update '96*, Appendix page A-26.

Advantages and Disadvantages, Continued

Other costs   Other costs and staffing issues:
- CAD needs training
- space
- staffing
- initial costs and confusion - may require more standardized operating procedures
- conversion period from the former system to the new CAD system
- Links and compatibility issues can cost time and money when attempting to interface with other systems or networks, especially if a paratransit broker is involved.

Estimated capital costs   A DOT nationwide APTS inventory conducted by the Volpe National Transportation Systems Center estimates the capital cost of computer aided dispatch systems at an average of $2300 per vehicle and a range of $600 to $7500 per vehicle. This was based on 23 responding agencies.

For more information, see the Internet page:
http://www.fta.dot.gov/library/technology/APTS/iti/iti.htm

Examples

Length   5 minutes lecture/discussion

Slide:
Examples

Continued on next page

Examples, Continued

Example: Winston Salem Transit Authority	The Winston-Salem Transit Authority (WSTA) in North Carolina operates 22 paratransit vehicles, as well as 54 fixed-route buses and 75 vanpools with an average daily ridership of 9000, plus paratransit ridership. The paratransit service is called Trans-AID.

WSTA completed Phase I of a Mobility Manager program in December of 1995. They implemented computer-aided dispatch and scheduling for their entire paratransit fleet, and installed Mobile Data Terminals (MDTs) and AVL on three of their paratransit fleet.

The results of this trial of their AVL paratransit CAD system have:
- decreased operating expense by 8.5% per vehicle mile and by 2.4% per passenger trip
- increased customer satisfaction by 17.5%
- enabled client base to increase by 100%
  ◊ This was an indirect result of being able to service more customers since client base is an ADA eligibility issue, not necessarily technology related.
- decreased passenger waiting time by 50%
- AVL greatly assisted the dispatchers
- MDT allowed the employee hours to be reconciled easily with the driver manifests (the drivers did not have to manually write their manifests anymore).

WSTA began Phase II in 1998, and will upgrade the entire paratransit fleet with MDT/AVL, as well as their transit fleet. They plan to tie the information collected to a real-time paratransit and transit automated information system.

Examples, Continued

Example -   **Say**: Santa Clara County, CA has a paratransit operator
Santa Clara called OUTREACH, which serves 7,500 clients every year.
They successfully use three new technologies:
- a digital geographic database
- scheduling and dispatching software
- an AVL system

Say: OUTREACH is able to offer the following services to its
clients:
- toll-free scheduling phone line with a bilingual help staff
- unlimited rides for unlimited distances within the service area
- records of "no-show" (three "no-shows" per quarter are allowed)
- Open Return service
- requests up to fourteen days in advance
- subscription service
    ◊ an automatic service for scheduling commonly occurring trips
- ID cards
- a second vehicle dispatched if the client misses a ride and is stranded

Phase III has recently begun in which a paratransit interface
with fixed route transit is now possible for eligible clients.
OUTREACH has been able to increase shared rides from
38% to 55% and thus decrease its fleet size from 200 to 130
vehicles.

Say: For more information, see the table in the back of the
exercise for this module.

Examples, Continued

**Example:
Pierce
Transit**

Say: The Pierce County Transportation Benefit Area Authority (Pierce Transit) mission is to provide safe, courteous, reliable transportation services over a 275 square mile area with an estimated population of 600,000 in western Washington state.

Pierce Transit provides fixed route, demand response, vanpool, computerized ridematching for cars and vans, and intercounty express service to Seattle and Olympia. It includes:

- 56 routes that operate over approximately 900 miles of city streets, county routes, and state highways from Seattle through Tacoma and on to Olympia
- a fleet of 190 buses, most of which are wheelchair accessible, many of which run on compressed natural gas
- over 175 covered bus shelters and 20 park and ride lots
- The demand response service, called SHUTTLE, provides transportation for people with disabilities. To best serve disabled riders and maximize SHUTTLE efficiency, rides are organized on a subscription, group, or call-in basis. Over 500,000 trips were provided in 1995, with nearly 70% of these trips provided by a private contractor.

Pierce Transit's fixed route service traveled over 7 million miles during 1995 and carried over 10 million passengers.
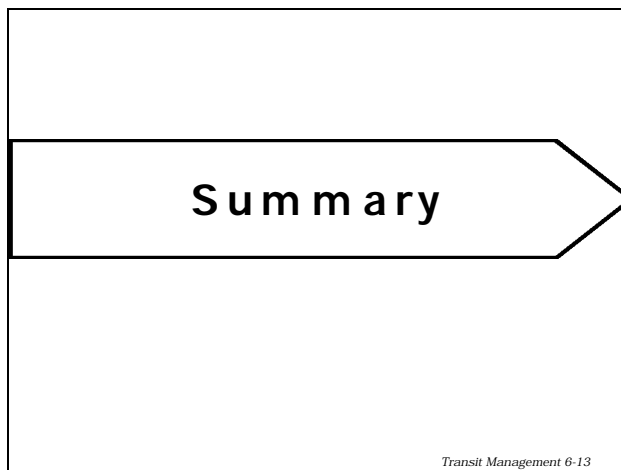
To advertise the SHUTTLE, and to sign up customers, Pierce Transit uses their Internet site *www.piercetransit.org/shuttle.htm*. The site also has maps and a reservation and information system.

Examples, Continued

Slide:
Summary

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                    │              Transit Management 6-13 │
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Summary   **Explain** resources that will provide students with additional
information. Refer to the appendix for listings of related
courses.

Transit Management Training Course	Title	ITS Professional Capacity Building		NTI course
		Technical Seminars	Short Courses	
Module 6: Paratransit	*See also Module 5*			
	Comprehensive ADA Paratransit Eligibility Determinations			x
	Efficiencies in Paratransit Scheduling and Dispatching			x
	Managing and Planning Paratransit Operations			x

| TABLE 6-1: APTS PARATRANSIT APPLICATIONS TECHNOLOGY REFERENCE		
Technology	*Description*	*Costs, Benefits, and Risks*
Scheduling and dispatching software	Computer software that aids in on-demand scheduling and dispatching	• Automates scheduling and dispatching activities, such as developing vehicle routes, matching clients to available vehicles, determining pick-up and drop-off locations • Generates reports and integrates with other agency functions • Creates multiple scheduling scenarios and solutions • Integrates easily with other ITS technologies for paratransit • Improves ADA compliance and passenger satisfaction • Many software vendors, but may have to do a lot of research before choosing one
Transit telecommunications	Typical applications include radio frequency (RF) and cellular digital packet data (CDPD) technology that carry signals from dispatch to vehicles, among others	• Assists in real-time scheduling and dispatching • Dispatch can communicate with and dynamically re-route their vehicles • Can be difficult to get radio frequencies due to high demand • CDPD technology very new and can be expensive
Geographic Information Systems (GIS)	Combination of maps and relational database to cross-reference transit information with maps	• Assists in real-time scheduling and dispatching • Helps operations planning and helps solve complex route problems • Can determine ADA route eligibility • Helps locate vehicles on street maps to assist in directions and to let clients know location of vehicles
AVL linkage	Automatic Vehicle Location devices that send signals to dispatch	• In real-time, can re-route and direct vehicles • Monitors position and status of vehicles and can pass on that information to customers • Risks are same as in Module 2: Automatic Vehicle Location Systems (interference, costs, monitoring off-route)
On-board mobile data terminals	Data terminals on board paratransit vehicles that transmit and receive instructions	• Allows real-time dispatching between paratransit center and vehicles • Can re-route and direct vehicles • Gathers information on trip length and number of passengers • Interacts with ID cards to obtain information on passenger eligibility and billing

Exercise 6-1: Custom Course Notes

Length   15 min.

**Slide:
Exercise 6-1**

> # Paratransit CAD
>
> **Exercise 6-1:
> Custom Course
> Notes**
>
> *Transit Management 6-14*
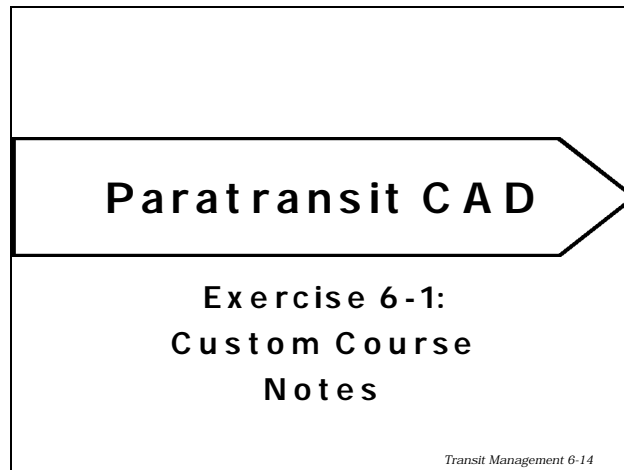
Leader instructions

Read the "In this exercise" and the directions to the class.

Say:
- Turn your student guides to called "Success story: A-Ride in Ann Arbor" on pages _____. Read the case study, then answer the three questions on page _____.

- **Allow** ten minutes for the students to read the case study and answer the questions.

Note to instructor: This exercise continues after the questions.

In this exercise

You will:
- be able to describe the possible benefits of using paratransit CAD technologies in your transit systems

Exercise 6-1: Custom Course Notes, Continued

Directions   Read the case study provided below and answer the
                 questions that follow.

Case study: Ann Arbor's paratransit service ("A-Ride"), as part of its
A-Ride in   advanced operating system deployment, has implemented
Ann Arbor   computer-aided dispatch, automated scheduling, and
                  advanced communications for its own five AVL-equipped
                  specialized paratransit vehicles and three subcontracted
                  vehicles. This integrated automated system is able to
                  provide service 24 hours per day, seven days a week, with
                  the services of a dispatcher needed only to take reservations
                  from callers, confirm rides, receive cancellations, and
                  intervene in special circumstances, such as "no shows."
                  Eventually, an interactive voice response system is expected
                  to reduce the number of calls dispatchers will have to handle
                  in person.

                  Each of the eight paratransit vehicles has an 800 megahertz
                  radio, onboard computer, and MDT. The system minimizes
                  voice transmissions by providing data messages regarding
                  vehicle status, operating condition, and location over a data
                  channel. A voice channel is available when it is necessary
                  for drivers and dispatchers to speak to each other.

Exercise 6-1: Custom Course Notes, Continued

Case study,   The MDTs have graphical screens with menu options and
continued   preprogrammed keys to interact with the various onboard
                 systems, including the radio. This allows the driver to select
                 an appropriate time to read and respond to text messages
                 sent from the dispatcher. The MDTs have various buttons for
                 the driver to hit at key points of a pickup: an Arrive button
                 when the driver arrives at a stop, a Perform button when a
                 customer has successfully entered the vehicle via the lift, and
                 a No Show button when the customer is not at the scheduled
                 pickup point.

Question 1   Which technologies are used by A-Ride as described above?

Question 2   List three benefits this technology of using ITS technologies
                 in the paratransit applications in your region.

Exercise 6-1: Custom Course Notes, Continued

Turn to   When students are finished with Exercise 2-1, direct them to
Module 10   Module 10.

Say: Open your book to Module 10, page _____. Using the student guide's information about paratransit and your knowledge of your own region and agency, customize this quick reference to help you plan when you return to your office. Respond to each item as follows:

- In **item 1**, circle the current status on Paratransit CAD technologies that are currently used in your region. Highlight potential technology for future applications.

- In **item 2**, read each of the questions and answer yes or no. "Yes" answers suggest your interest in applying ITS technologies to your paratransit needs.

- Read **item 3** to identify which types of technology are best suited to solve particular problems.

- In **item 4**, tell the students to write their own action items and/or ideas that this module suggests to them. For example:
  ◊ Are there any questions you want answered?
  ◊ Were there any web sites that you wanted to look at when you return to the office?
  ◊ Were there any courses or resources you wanted to find out more about?
  ◊ Did we mention any transit example that you want more information about — who can you contact and where?

Exercise 6-1: Custom Course Notes, Continued

For more information   **Say:** For additional information, read the table on page 30 in your student guides to look up additional examples of what is going on in the field.

Paratransit CAD Examples			
Technology	**Story**	***Update '98***	**Additional info**
Scheduling and dispatching software	SMART in Detroit, MI	p. 2-56	*Update '96,* p. 50
	Community Transit of Delaware County, Folsom, PA	p. 2-56	*Update '96,* p. 52
	OUTREACH, Santa Clara County, CA	p. 2-53	See example in SG p. 21. See also *Update '96,* p. 53.
Integration between agencies	Southern California Association of Governments (SCAG) Smart Shuttle, San Gabriel Valley, CA	p. 2-54	
AVL	METROLift, Houston, TX	p. 2-50	Trunked radio. See also *Update '96,* p. 55
Autonomous dial-a-ride transit (ADART)	Corpus Christi Regional Transportation Authority, Corpus Christi, TX	p. 2-51	For a description of ADART, see p. 2-49, the last paragraph of the State-of-the-art summary in *Update '98*
Internet	KITSAP transit agency at www.telebyte.com/kittrans		